CLAIMS

What is being claimed is:

1. A semiconductor light emitting device comprising:

a light emitting region disposed between a region of first conductivity type and a region of second conductivity type; and

at least one heavily doped layer disposed within the region of first conductivity type, wherein the heavily doped layer is more heavily doped than the region of first conductivity type.

2. The device of claim 1 wherein the light emitting region comprises at least one layer of InGaP.

3. The device of claim 1 wherein the light emitting region comprises at least one layer of InGaN.

4. The device of claim 1 further comprising a plurality of heavily doped layers disposed within the region of first conductivity type.

5. The device of claim 4 wherein:

each of the plurality of heavily doped layers is between about 10 nm and about 100 nm thick; and

the plurality of heavily doped layers are separated by at least 10 nm of region of first conductivity type.

6. The device of claim 4 wherein a total thickness of the plurality of heavily doped layers is between about 100 nm and about 500 nm.

7. The device of claim 1 wherein:

the region of first conductivity type has a dopant concentration between about $5x10^{17}$ and about $1x10^{18}$ cm^{-3}; and

the heavily doped layer has a dopant concentration between about $1x10^{18}$ and about $1x10^{19}$ cm^{-3}.

8. The device of claim 1 wherein the heavily doped layer comprises $(Al_xGa_{1-x})_{0.5}In_{0.5}P$, where $0<x \trianglelefteq$.

9. The device of claim 8 wherein the heavily doped layer comprises $(Al_xGa_{1-x})_{0.5}In_{0.5}P$, where $0.2<x<0.7$.

10. The device of claim 8 wherein the heavily doped layer comprises $(Al_{0.65}Ga_{0.35})_{0.5}In_{0.5}P$.

11. The device of claim 1 wherein the heavily doped layer comprises $Al_xIn_yGa_zN$, where $0<x\leq 1$, $0<y\leq 1$, and $0<z\leq 1$.

12. The device of claim 1 wherein the heavily doped layer comprises GaN.

13. The device of claim 1 wherein the heavily doped layer is a first heavily doped layer, the device further comprising a second heavily doped layer disposed within the region of second conductivity type, wherein the second heavily doped layer is more heavily doped than the region of second conductivity type.

14. The device of claim 1 wherein the region of first conductivity type and the region of second conductivity type are cladding layers adjacent to the active region, the device further comprising:

a contact region of first conductivity type adjacent to a surface of the cladding layer of first conductivity type opposite the active region; and

a contact region of second conductivity type adjacent to a surface of the cladding layer of second conductivity type opposite the active region.

15. The device claim 14 wherein the heavily doped layer is a first heavily doped layer disposed within the cladding layer of first conductivity type, the device further comprising a second heavily doped layer disposed within the contact region of first conductivity type, wherein the second heavily doped layer is more heavily doped than the contact region of first conductivity type.

16. The device claim 14 wherein the heavily doped layer is a first heavily doped layer disposed within the cladding layer of first conductivity type, the device further comprising a second heavily doped layer disposed within the contact region of second conductivity type, wherein the second heavily doped layer is more heavily doped than the contact region of second conductivity type.

17. The device of claim 1 wherein:

the region of first conductivity type and the region of second conductivity type are contact regions;

the contact region of first conductivity type is spaced apart from the active region by a cladding region of first conductivity type; and

the contact region of second conductivity type is spaced apart from the active region by a cladding region of second conductivity type.

18. The device of claim 17 the heavily doped layer is a first heavily doped layer disposed within the contact region of first conductivity type, the device further comprising a

second heavily doped layer disposed within the contact region of second conductivity type, wherein the second heavily doped layer is more heavily doped than the contact region of second conductivity type.

19. The device of claim 1 further comprising:

a first lead electrically connected to the region of first conductivity type;

a second lead electrically connected to the region of second conductivity type; and

a cover disposed over the active region.